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ABSTRACT

This study evaluated the practicality of using videodiscs to distribute the television programs that are part of the courses of the International University Consortium (IUC) for Telecommunications in Learning, a network of colleges and universities in partnership with public broadcasting stations and cable systems. Fifteen videodisc players, along with videodiscs of IUC's "Exploring Language" course, were placed at sites around the United States and Korea, including universities, hospitals, corporate facilities, and military and government sites. Some students also viewed the programs through member cable companies and public broadcasting stations. Results demonstrated that the use of videodisc technology is an economically viable alternative distribution system for IUC programs. This report summarizes evaluation procedures and results at the University of Maryland University College, College Park, Maryland, and its education center at Kunsan Air Base in Korea; University of South Alabama, Mobile; Linfield College, McMinnville, Oregon; Hampton Institute, Hampton, Virginia; the Pennsylvania State University, University Park; the Maryland Center for Public Broadcasting, which used videodisc as a point of origin for broadcasting; and the Defense Activity for Non-Traditional Education Support (DANTES), which evaluated the use of videodisc technology to deliver instruction to servicemembers stationed around the world. (LMM)

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VIDEODISC FEASIBILITY STUDY

An evaluation of the use of videodisc as a distribution medium by the International University Consortium in cooperation with Pioneer Video, Inc.

By: Ralph France

Maryland Center for Public Broadcasting

October 10, 1983

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During the spring of 1983, the International University Consortium (formerly the National University Consortium) conducted a study to evaluate the practicality of utilizing videodiscs as a distribution medium for television programs which are part of its courses. Through the cooperation of Pioneer Video, Inc., 15 videodisc players (Model PR8210) were placed at various sites around the United States and Korea, along with videodiscs of IUC'S "Exploring Language" course.

The study will have major impact on the use of telecommunication technology for non-traditional learning. Although the study examines the use of videodisc as a distribution medium, it lays the groundwork for taking full advantage of the interactive capabilities of videodisc in IUC's future course development.

Background

The International University Consortium for Telecommunications in Learning is a network of colleges and universities in partnership with public broadcasting stations and cable systems. Through its members, IUC offers adult part-time students the opportunity to earn a bachelor's degree without attending on-campus classes. Now in its third year of operation, 20 schools and 24 television stations are members of the Consortium.

IUC's guided study courses are print intensive and require an average of 20 hours of reading per week. A series of 8 half-hour television programs motivate, supplement and pace student learning. IUC currently offers baccalaureate degree courses in three areas of study.

Modelled after the British Open University, IUC has a current inventory of 20 courses, adding new courses to its inventory each year.

Because of the needs of its unique student population, IUC endeavors to provide easy access to learning for the working adult. Member cable companies and public broadcasters provide one means for students to view the programs. The member colleges and universities would also like to place the programs at learning centers where individual students can review them at their convenience. Groups of students, like nurses, corporate employees, military and government personnel, have a need to view the programs at on-site learning centers. By providing increased access to the programs, member schools can increase the number of students they serve.

Since 1980, the Maryland Center for Public Broadcasting has been uplinking IUC programs to PBS's Westar IV satellite. The feeds now occur 52 weeks a year and require 2½ hours of satellite time per week. The IUC member public broadcasters record the feeds, store the programs on tapes and locally broadcast the programs during the semester. The public broadcasters can store and build an inventory of IUC courses. This could allow the member colleges and universities the flexibility of offering any course within a station's tape inventory. However, the cost of maintaining this inventory forces the stations to erase and reuse the tapes each semester. Thus, IUC must repeat courses in its satellite schedule. Because most cable companies are unable to record the satellite feeds, 3/4 inch time base corrected video cassettes are dubbed and shipped by IUC.

Obviously, each of these distribution processes involves some cost to IUC members. When the Maryland Center for Public Broadcasting feeds the satellite, certain costs are incurred, e.g., videotape machine, engineering personnel, uplink facilities, as well as administrative costs. However, in support of IUC, these costs have been absorbed. Likewise, the Public Broadcasting Service has made the satellite time available at no charge. Member stations must provide tape stock, engineering time, tape machines and storage space.

As stated, IUC's member colleges and universities would like to have the programs on 3/4 inch cassette, make multiple copies and place them in learning centers and at the various sites on and off campus. In response to an IUC survey in late 1982, member institutions indicated that such cassette duplication would cost them between $250 to $300 per 8 program course.

The question then, is, is there a more cost effective way to distribute this growing inventory of video programs? Is videodisc the answer? The findings of IUC's feasibility study address this need.

In November of 1982, agreement was reached between IUC and Pioneer Video, Inc. to conduct the study. IUC selected the award-winning series "Exploring Language: Thinking, Writing, Communicating," produced by the Maryland Center for Public Broadcasting, as the course to be mastered onto videodisc. Eight half-hour programs were then dubbed from the 2" quad masters onto one inch type C tape. The programs were then broken down into logical content segments (chapters). The beginning of each chapter was identified with a time code reference number. The tapes

were shipped to Pioneer's facilities in California for mastering in constant angular velocity (CAV) mode.

An academic consultant developed a series of thought provoking questions for each program. These questions were used by individuals and groups of students in discussion sessions. The use of chapters was not intended to make the discs interactive. It simply allowed rapid access to specific content segments. This feature enabled one of the studies' participants, The Pennsylvania State University, to expand the use of the programs into other courses.

To introduce disc technology to faculty and students, IUC adapted a set of operating instructions from the more detailed manual which is packaged with the Pioneer players. These abbreviated instructions were affixed to the disc album jackets.

The videodisc players and discs were shipped to the following participants who evaluated the technology during the spring semester:

UNIVERSITY OF MARYLAND UNIVERSITY COLLEGE (UMUC), College Park, Md., is one of five campuses in the University of Maryland system. UMUC offers undergraduate and professional development courses to adult part-time students who attend classes at the Center of Adult Education or off-campus at community centers and military installations as part of the stateside and overseas programs.

As a result of its successful experience with the British Open University program of directed study, UMUC and the Maryland Center for Public Broadcasting founded the National University Consortium in 1980. The Open University (OU) enrolls an average of 400 students in the NUC program each semester.

The Open University used videodiscs as a teaching aid in student discussion sessions held in conjunction with Exploring Language (Humanities 221). Tutors were instructed on the use of the technology and were briefed on the goals of the evaluation. Both tutors thought it was important to show the video programs to stimulate discussion and generate ideas for student papers. According to one tutor, "The most wonderful thing about the machinery for me is that the material is accessible." Both tutors preferred videodisc to cassette because the technology gave them more options in the use of the video programs. From a more technical perspective, the Head of the Non-print Media Services who supervised the equipment during the study was "impressed with the quality (of the videodisc) in terms of its stability and ease of operation."

The UMUC Asian Division also participated in the evaluation of videodisc through its education center at Kunsan Air Base in Korea. Service members

at the base enrolled in Exploring Language through the Open University. Students worked independently and viewed the video programs as their schedules permitted. The Education Services Officer gave the technology portion of the study an "Excellent" rating. The equipment was found to be both dependable and easy to operate. Commenting further on the difficulty of making courses available "...because of mission, alerts, long working hours, (and) shift-workers. I did and still do think the program (IUC's course offerings) viable for our situation."

UNIVERSITY OF SOUTH ALABAMA (Mobile, Ala.) is the only major public institution of higher education on the upper Gulf Coast. It serves a population that has not, for the most part had an opportunity to earn a college degree. A member of the Consortium since June 1981, the University of South Alabama offers NUC courses through the Personalized Study Program for Adults.

The University of South Alabama does not have a public television station relationship. However, a local cable company does provide coverage to approximately 55% of their potential student population. The videodisc study afforded the opportunity to evaluate a secondary delivery system. The disc player was placed in a learning center located in the University library. This gave the individuals in the Exploring Language class (approximately one-third of the 38 student class) who did not have access to the cable system, a way to view the television component at their leisure. "The students found the system an excellent way to view the program(s). More importantly, however, was the possibility that a student could review any portion of the disc in a rapid and productive manner. The technical staff was impressed by the delivery system, but were concerned about future costs of discs. The faculty was generally frightened by the new technology."

In an effort to dispel their fears, a second use was made of the system. Staff, faculty and administrative personnel were involved in training in the use of the system.

"In conclusion, we had excellent results with the Pioneer project." In fact, the University is now purchasing two complete Pioneer PR8210 LaserDisc Players and two sets of the Exploring Language discs.

LINFIELD COLLEGE (McMinnville, Oregon) established its off-campus degree program in 1974 to serve part-time students in Western Oregon. Students enrolled in Linfield's program may earn a bachelor's degree in liberal studies or management; a nursing degree program is now under review. A member of the Consortium since the pilot-year (1980-81), Linfield's success with the IUC program has allowed the off-campus degree program to operate as a self-supporting division of the college. An average of 50 students per semester enroll in IUC courses at Linfield.

Linfield's participation in the videodisc evaluation emphasized the convenience of IUC courses for adults who are unable to attend regular college classes because of their irregular work schedules. In Coos Bay, uniformed service officers enrolled in Exploring Language and were able to view the television programs on disc at the local community college library, which provided facilities for the study. Having no cable or broadcast access to the programs, videodisc or videocassette were the only means of allowing these students to view the programs.

Exploring Language was also offered at Good Samaritan Hospital (Portland) for student nurses working at the hospital. In addition to the instructional use of the disc player, the hospital staff experimented with the technology in programs sponsored by the hospital. The television programs for Exploring Language were shown on the hospital's in-house system for viewing by patients.

HAMPTON INSTITUTE (Hampton, Virginia) is an urban college enrolling over 3,000 students both on-campus and at learning centers in a 150-mile radius. The learning centers serve military personnel at Langley Air Force Base, Fort Eustis, Fort Monroe and the Naval Base in Norfolk.

A member of the Consortium since July 1982, Hampton has a strong interest in telecommunications-assisted instruction. Its participation in the videodisc demonstration introduced this method of instruction in a nontraditional setting to administrators, staff and faculty, potential students, and members of the Armed Services.

Evaluation of the disc was done by individuals and groups. Instructors from various academic disciplines tested the videodisc and concluded that it would be "quite effective in a small group setting... and with large groups, provided sufficient monitors were available."

It was further found... "that the review questions were of greater value to the student when they were distributed after the reading (assignments) and prior to viewing the videodisc." A suggestion was made to utilize automatic stops at the end of each chapter.

"The strongest support came from military personnel - particularly the Navy. The videodisc would be ideal for on-board use, especially on board a submarine where space is limited. Administrators viewed the videodisc as a money saver over the long haul as compared to the videocassette player. Its durability, compactness, and the high quality of the disc adds to the uniqueness of the videodisc."

"Summary: Evaluation of the videodisc project at Hampton Institute was a success. During the evaluation period, every aspect of the component was tested. The results were excellent. The suitability of the videodisc being used in remote areas and under restricted conditions was tested to a high degree. The results proved that the equipment is durable, simple to operate, and provides the flexibility needed to satisfy the unique requirements of the military and other users. Every effort should be directed toward promoting the usage of the videodisc for educational purposes at the earliest possible date."

THE PENNSYLVANIA STATE UNIVERSITY (University Park, PA) is the state's largest public institution of higher education. Correspondence courses at PSU began at the turn of the century and now include radio and television-assisted courses. The Open Learning program offers over 130 baccalaureate and associate degree courses. Penn State has been a member of the International University Consortium for two years.

Penn State's participation in the videodisc project was coordinated by the Division of Learning and Telecommunications Services. One disc player was placed in the Campus Library/Learning Center at the Delaware County Campus. A second player was used by PENNARAMA for origination directly into a cable network. Faculty, students and technical staff were involved in the evaluation.

As mentioned earlier, the Director of the Delaware County Campus took the initiative to introduce disc technology not only to faculty in the Department of English, but to faculty in other disciplines as well. As a result, faculty teaching three other courses, "Individual and Family Studies 329," "Anthropology 21," and "Journalism 200" selected appropriate segments of various programs to show their students. "The reaction of both faculty and students to the materials was excellent...Technical quality far exceeds anything we had anticipated... The most common question from faculty and staff at Delaware County Campus is, when will more materials be available? They expressed disappointment when they are told that this is a demonstration project, and it is the only use that is now planned."

A second videodisc player was also provided to The Pennsylvania State University for testing its use for cable origination. PENNARAMA is a statewide educational cable network with a subscriber count of 450,000.

The technical staff conducted a demonstration and made the following report: "The demonstration was in two parts: direct manual feed from the player into PENNARAMA cable; direct feed from player for recording to videocassette for use in the automated origination system for PENNARAMA.

1. "Direct Manual Feed:

   Program #6 was fed directly into the PENNARAMA network. The schedule followed the regular pattern of telecasts, and the disc version of the program was inserted successfully after an initial familiarization period in which we found that the disc version ran 5-seconds longer than the tape version. This made it necessary to identify a suitable switching point that would cause the least amount of visual and audio disturbance. The program was inserted from disc seven times over a five-day period.

2. "Recording to Videocassette:

   We assemble programming for PENNARAMA onto 3/4-inch videocassette for use in an automated system... The videodisc fit in very well with the existing equipment and procedures. There were no problems while assembling EXPLORING LANGUAGE Program #8 onto cassette.

"Signal quality was excellent. The technicians involved reported no problems worthy of mention. When viewing 'raw' feeds from both the disc and the cassette players, the disc output appeared more stable.

"Ease of operation. After becoming familiar with the equipment (and only reading those instructions provided on the jacket of the EXPLORING LANGUAGE disc), we found the Pioneer player to be very

responsive, accurate, and easy to operate. The only criticism of the unit was the small lettering on the display panel, making it difficult to read what was indicated when the various function lights came on.

"The instant roll of the disc made it easy to cue and insert the video material into the programming schedule.

"In summary, we found the Pioneer Videodisc Player (PR8210) to be technically appropriate for origination into the PENNARAMA system."

Note:

The variation in program length between playback on disc vs. cassette had generated concern. Given that the broadcast length of each program is 28:50 when played on 1" or 2" tape, a comparison was made between disc and cassette playback for each program. It was found that in each case the videodisc ran 28:50 while the cassettes varied by as much as six seconds. The disc playback times were also confirmed by the master control director at the Maryland Center for Public Broadcasting.

THE MARYLAND CENTER FOR PUBLIC BROADCASTING (Owings Mills, Md.) was established in 1969; there are currently six stations servicing Maryland residents.

A founding member of the International University Consortium, MCPB distributes all of the video programs for IUC courses, including the Exploring Language series. The Maryland Center transmits these programs to other television stations in the Consortium via satellite. The Maryland Center also broadcasts IUC programs for the University of Maryland Open University. The Maryland Center for Public Broadcasting, through its local airing of Exploring Language, on February 5, 1983 became the first broadcaster to use videodisc as a point of origin. Under the supervision of Bruce T. Herget, Director of Engineering, the programs were broadcast and evaluated biweekly during the spring of '83.

"The Pioneer LaserDisc machine was found to be very easy to operate and could be cued to first video with instant lock-up when placed in "play" mode. The Master Control Directors found this to be a very important function for our type of operation.

"The video signal (see photographs) was very good and needed very little processing, nor did it need a TBC for broadcast. This is surprising for a unit that costs under one thousand dollars. We did process the video with our normal program video processing amplifier that feeds our WMPB transmitter. The video signal was also sent, unprocessed to the other transmitters in the Maryland Network, WAPB, WWPB, and WCPB. The audio signal was of good quality also."

The advantages of videodisc over videotape cited in this evaluation are that the equipment is "quiet; requires little space; has stereo capability; instant video lock-up; does not require a time base corrector, house sync, burst or other inputs; is not susceptible to 'head clogs'; less space is required for disc storage vs. any videotape; lower cost for machines vs. VTR or VCR."

The disadvantages cited were: "cannot rerecord on same disc; strong vibration or bumping can cause the laser beam to skip; nonstandard connectors are used." And finally, "because the extended play does not allow the same features as the standard play, e.g., frame accurate cueing, programming length is limited to 30 minutes per side."

"With all the above in consideration, the Pioneer LaserDisc is ... far better than any 3/4 inch machine I've seen or worked with. I would like to have several at each of my transmitter sites with the hope of doing away with the film chains."

Evaluation was also provided by the Master Control Director involved with broadcasting the discs. "Working with the videodisc player has been great. With its ease of operation, reliability, picture quality and compact space requirements, I wouldn't mind if all our shows were aired via disc (only thing missing is record capability). Among my favorite features are lack of setup needs and incredible ease of cueing. A couple of things for even better operation ...at the remote station: a main unit off/on switch, and indicator lights to show mode currently in use -- And on the unit - an audio output control and meter. It would also be good if chapter/frame readouts could be isolated to preview and kept off line, to avoid accidental airing ..."

DANTES

In addition to the IUC members involved in the videodisc project, the DEFENSE ACTIVITY FOR NON-TRADITIONAL EDUCATION SUPPORT (DANTES) evaluated the use of videodisc technology to deliver instruction to servicemembers stationed around the world. Videodisc players and the instructional materials for Exploring Language were placed at Fort Devens, Massachusetts (Army), the Naval Air Station at Key West, Florida, the Marine Air Corps Station at El Toro, California, and at Kunsan Air Base in Korea. Because of their schedule, assignment, or location, many servicemembers are unable to take advantage of traditional courses. Thus, videocassette or videodisc are often the only means of providing IUC's video programs.

The evaluation at Kunsan Air Base has been cited earlier. Feedback from the remaining participants suggests that the "simplified" operating instructions contained on the disc jacket may have been confusing. Since the instructions attempted to cover both broadcast and non-broadcast uses, it may be desirable to provide separate instructions in the future.

Concern for the future need to purchase videodisc equipment, when videocassette equipment already exists, was also expressed. This will be discussed in the Evaluation Summary which follows.

Evaluation Summary:

As demonstrated by the participants in the IUC Pioneer study, videodisc technology is an acceptable means of distributing the video component of IUC's courses. From an instructional perspective, faculty and students found the new technology desirable, given the ease of operation and the capability to access specific content segments. This feature allowed faculty from a variety of disciplines at The Pennsylvania State University to show selected segments of programs to their students. Thus, many more students than originally intended were able to make use of the programs. From a technical perspective the most crucial question has been answered. Videodisc can be used for broadcast with minimal additional equipment. As cited, technical evaluation at the broadcast signal was rated superior to 3/4 inch time base corrected video cassettes. Suggested modifications to the hardware would improve the ease of operation functionally from a broadcaster's perspective.

This leaves the final question to be addressed. How can IUC's television programs be distributed via videodisc at a cost no greater or less than the current methods of distribution?

Based on the members' experience with off-campus programs and their desire to establish learning centers at a variety of sites including hospitals, corporations and military settings; it becomes apparent that many copies of each course will be needed. As with most products, the cost per unit decreases with an increase in the quantity produced. The cost to manufacture and distribute a limited number of copies of only one IUC course on videodisc would not be cost effective. But as the quantity approaches 200 or more, the cost of disc copies vs. cassette copies is less. Now,

even though the videodisc player used in this study costs less than a 3/4 inch cassette player, one course on videodisc would not justify the expenditure... but 20 courses would. In fact, the savings of duplicating a number of courses on videodisc vs. video cassette could virtually eliminate the hardware costs. In other words, IUC's wealth of courseware could allow members to set up learning centers using videodisc hardware and software at a cost no greater or less than the duplication costs alone of video cassettes. In addition to learning centers, the other costs, either real or absorbed, associated with satellite distribution would be impacted in a positive manner.

Implications for the future:

Although the results of this study demonstrate that the use of videodisc technology is an economically viable alternative distribution medium for IUC programs, it really sets the stage for much more.

In the educational arena, interactive videodisc instruction is in its infancy. Colleges and universities have been reluctant to purchase videodisc hardware because of the capital costs and because of the limited amount of instructional software available. Software has been slow coming since the market is limited due to the lack of hardware. This "chicken and egg" riddle has been around for sometime and is a major reason for this limited use of interactive videodisc instruction.

If IUC elects to use the videodisc technology for distribution, part of this riddle can be solved. Many more questions, beyond the scope of this paper, will have to be broached. But once a portion of the technology is in place, IUC will be able to develop sophisticated interactive videodisc courseware, in order to better serve an ever-growing population of adult students.